assigning a grouping hierarchy for the first and second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and

calculating an orientation and position of the child object relative to the first virtual object.

assigning an origin on the first virtual object around which the second virtual object can rotate; and

assigning a three-dimensional constraint of motion to the second virtual object that constrains how the second virtual object can rotate with respect to the first virtual object.

107. (Amended) The medium of claim 102, further comprising specifying a minimum angle and a maximum angle that the second virtual object can rotate with respect to the origin.

108. (Amended) The medium of claim 102, further comprising assigning an attributes to the grouped object, wherein the attribute is texture, color, normal direction, maximum rotation angle, or minimum rotation angle.

REMARKS

Claims 1-46, 48-94, and 97-108 are pending. In the Office Action dated November 11, 2000, the Examiner rejected all claims under 35 U.S.C. 251 as being an improper recapture of subject matter surrendered in the application for the patent upon which the present reissue is based. Applicants respectfully traverse the Examiner's rejection for reasons set forth below.

Regarding the rejection of claims 1-9, Applicants contend the Examiner's interpretation of the reissue statute is contrary to that of the Federal Circuit. In Clement, the reissue application included claims 1-18, which corresponded to claims 1-18 of the original patent, and claims 49-52, which were admittedly broader than the original patent's claims. While the Federal Circuit held that claims 49-52 had been impermissibly broadened in violation of the recapture rule, the Court nevertheless held that original claims 1-18 were allowable despite the Examiner's attempts to invalidate them for a defective declaration (i.e., for failure to properly state an error warranting reissue). The Court noted that "because under 35 U.S.C. § 252 (1994) the surrender of the '179 patent does not take effect until the reissue patent issues, 'original claims 1-18 [not subject to the

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recapture rule] continue to exist with their normal presumption of validity,' unaffected by the examiner's rejection based on the allegedly defective declaration." [1] Thus, Applicants contend that unless the Examiner is able to find a substantive reason for rejecting claims 1-9 (e.g., new prior art), claims 1-9 should be allowed.

During the prosecution of U.S. Patent 5,559,995, the claims were amended in a response dated April 1, 1996. Prior to the amendment, the Examiner rejected all claims based on different combinations of Wexelblat, et al. (U.S. Patent No. 5,021,976), Richburg (U.S. Patent No. 5,159,687), and Fisher, et al. ("Virtual Environment Display System").

In the April 1, 1996 response, Applicants noted that the combination of cited art failed to teach or disclose a "grouping means" as recited in claim 1 and claim 7 (see top of pages 10 and 13 of April 1, 1996, response). Applicants contend that a feature similar to the "grouping means" is included in the pending claims, as highlighted below.

In general, Applicants contend that claims 10-108 do not violate the recapture rule because the features germane to the prior art rejection (i.e., the "grouping means") have been included and because additional features have included which material change the scope of the claims such that they materially differ from the coverage of the original claims 1-10. Applicants note that the original application only included apparatus claims, and, as the Examiner noted, Applicants are entitled to include method and computer medium claims as part of the reissue application. Applicants note that method and computer medium claims inherently require different language than apparatus claims. Thus, Applicants contend that the Examiner's apparent requirement that the exact wording of the original claims be copied verbatim *in toto* into any new claims is unworkable. Below, Applicants have attempted to succinctly highlight which features have been incorporated into the new reissue application claims relative to the amendments made to the claims in the original application.

Regarding claims 46-56 and 69-83, Applicants request that the Examiner compare claims 46 and 69 with claim 1 from the reissue application (see tables below). Applicants contend that claim 46 includes all features germane to the prior art rejection of claim 1. Applicants further

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[1] *In Re Clement, 45 USPQ.2d 1161, 1167 (Fed. Cir. 1997)*

note that the scope of claim 46 is different than claim 1 because claim 46 recites "assigning a grouping hierarchy for the first and second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and calculating an orientation and position of the child object relative to the first virtual object."

Claim from original patent (with additions underlined)	Claim in present reissue application (emphasis added)
1. An apparatus for creating a virtual world data base, comprising:	46. (Amended) A memory media comprising program instructions for creating a data base representing a virtual world, wherein the program instructions are executable to implement:
receiving means for receiving <u>first, second and third polygon representations</u> of <u>respective first, second and third virtual objects</u> in a virtual world;	receiving a plurality of polygon representations of a plurality of virtual objects including a first virtual object, a second virtual object, and a third virtual object;
<u>selecting means, coupled to said receiving means, for selecting a first edge of said first virtual object and for selecting a second edge of said second virtual object;</u> and	selecting the first and second virtual objects from said plurality of polygon representations of virtual objects using edges of the virtual objects;
grouping means, coupled to the receiving means <u>and the selecting means</u>, for grouping <u>said first and second virtual</u> objects in the virtual world into <u>a grouped object comprising said first and second virtual objects joined at an intersection of the first and second edges, the grouped object represented by</u> at least one of <u>a three-dimensional and rotatable</u> wireframe	grouping the first and second virtual objects into a three-dimensional grouped object represented by at least one of the following: a three-dimensional and rotatable wireframe object, and a three-dimensional and rotatable polygon object; assigning a grouping hierarchy for the first and

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object and a three-dimensional and rotatable sweep polygon.	second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and calculating an orientation and position of the child object relative to the first virtual object.

Applicants further highlight that dependent claims 47-57 recited additional features not addressed in claim 1, and thus differ in scope sufficiently to avoid the recapture rule. For example claim 53 recites "assigning color values to the grouped object, wherein each virtual object in the grouped object inherits the color values." Applicants contend that these additional features materially change the scope of claims 47-57 relative to the original claims.

Claim from original patent (with additions underlined)	Claim in present reissue application
1. An apparatus for creating a virtual world data base, comprising:	69. (Amended) A method for creating a data base representing a virtual world, the method comprising:
receiving means for receiving first, second and third polygon representations of respective first, second and third virtual objects in a virtual world;	receiving a plurality of polygon representations of virtual objects, wherein the plurality of polygon representations include a first, a second, and a third representation of respective first, second, and third virtual objects, wherein the virtual objects have edges;
selecting means, coupled to said receiving means, for selecting a first edge of said first virtual object and for selecting a second edge of said second virtual object; and	selecting first and second virtual objects using the edges from said plurality of polygon representations of virtual objects;
grouping means, coupled to the receiving means and the selecting means, for grouping said first and second virtual objects in the	grouping the first and second virtual objects into a grouped object comprising a combination of the first and second virtual

virtual world into <u>a grouped object comprising</u> <u>said first and second virtual objects joined at</u> <u>an intersection of the first and second edges,</u>	objects, wherein the first and second virtual objects intersect; and

<u>the grouped object represented by</u> at least one of <u>a three-dimensional and rotatable</u> wireframe <u>object</u> and <u>a three-dimensional and rotatable</u> <u>sweep polygon</u>.	representing the grouped object by at least one of the following:
	
	    a three-dimensional and rotatable wireframe object, and
	
	    a three-dimensional and rotatable sweep polygon object.

Applicants further highlight that dependent claims 70-83 recited additional features not addressed in claim 1, and thus differ in scope sufficiently to avoid the recapture rule. For example claim 70 recites "assigning a grouping hierarchy for the first and second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and calculating an orientation and position of the child object relative to the first virtual object."

Regarding claims 84-94, Applicants contend that claims 84-94 includes all of the features germane to the prior art rejection based on Wexelblat, et al. (U.S. Patent 5,021,976) and Fisher, et al ("Virtual Environment Display System), as illustrated in the table below. Applicants also note that additional features are recited in claim 84 that are not cited in claim 1, e.g., "assign a grouping hierarchy to the first and second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and calculate an orientation and position of the child object relative to the first virtual object." Applicants contend that with these additional features, claim 84 is not an attempt to recapture subject matter forfeited during prosecution, but rather an attempt to claim a different aspect of the invention. Applicants contend that this is permissible since this reissue application with filed within the two year statutory timeframe for broadening reissues. Applicants content that requiring **verbatim** every word from the previous claim is an overly harsh interpretation of the recapture rule. Applicants contend that this interpretation defies the clear language and intent of the reissue statute, as interpreted by the

courts, which have stated that the reissue statute and recapture rule should be applied in an equitable manner.[2]

Claim from original patent (with additions underlined)	Claim in present reissue application
1. An apparatus for creating a virtual world data base, comprising:	84. (Amended) A computer program for creating a virtual world data base, wherein said computer program is embodied on computer-readable media and comprises instructions configured to:
receiving means for receiving <u>first, second and third polygon representations</u> of <u>respective first, second and third virtual objects</u> in a virtual world;	read polygon representations of a plurality of virtual objects, including a first virtual object, a second virtual object, and a third virtual object;
<u>selecting means, coupled to said receiving means, for selecting a first edge of said first virtual object and for selecting a second edge of said second virtual object;</u> and	select the first virtual object and the second virtual object from said plurality of virtual objects;
	assign attributes to the first and second virtual objects;
grouping means, coupled to the receiving means <u>and the selecting means</u>, for grouping <u>said first and second virtual</u> objects in the virtual world into <u>a grouped object comprising said first and second virtual objects joined at an intersection of the first and second edges,</u>	group said first and second virtual objects into a grouped object, wherein said first and second virtual objects intersect;
<u>the grouped object represented by</u> at least one of <u>a three-dimensional and rotatable</u> wireframe <u>object</u> and <u>a three-dimensional and rotatable sweep polygon</u>.	represent the grouped object by at least one of the following: a three-dimensional and rotatable wireframe object, and a three-dimensional and rotatable

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[2] *See Ball Corp. v. U.S., 221 USPQ 289, 296 (Fed. Cir. 1984).*

	polygon object;
	assign a grouping hierarchy to the first and second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and calculate an orientation and position of the child object relative to the first virtual object.

Regarding claims 97-101, Applicants respectfully request that the Examiner compare claim 97 of this reissue application with claim 8 of the original patent (see table below). Applicants contend that claim 95 has all of the features germane to the prior art rejection that were added to claim 1 during the prosecution of the original patent, including the "means" language referred to by the Examiner. Applicants contend that the changes to the rendering means were clearly not to overcome the prior art, but rather for grammatical reasons. Since the rendering means was not narrowed in response to the prior art, the recapture rule does not apply to this element. Thus Applicants contend that claims 97-101 do not violate the recapture rule.

Claim from original patent (with additions underlined)	Claim in present reissue application
8. An apparatus for creating a virtual world comprising:	97. (Amended) An apparatus for creating a virtual world data base, comprising:
receiving means for receiving first, second and third polygon representations of respective first, second and third virtual objects in a virtual world;	a receiving means for receiving first and second polygon representations of respective first and second virtual objects in a virtual world;
selecting means, coupled to said receiving means, for selecting a first edge of a first virtual object and for selecting a second edge of a second virtual object; and	a selecting means coupled to said receiving means and configured to select said first and second virtual objects by selecting one edge from each of said first and second virtual objects;

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grouping means, coupled to the receiving means and <u>the selecting means</u>, for grouping said first and second virtual objects in the virtual world into <u>a grouped object comprising said first and second virtual objects joined at an intersection of the first and second edges, the grouped object represented by</u> at least one of <u>a three-dimensional and rotatable</u> wireframe <u>object</u> and <u>a three-dimensional and rotatable sweep</u> polygon;	a grouping means coupled to said receiving means and selecting means, wherein said grouping means is configured to group said first and second virtual objects into a grouped object, wherein the grouped object is represented by at least one of a three-dimensional and rotatable wireframe object and a three dimensional and rotatable polygon object; and
attribute assigning means, coupled to the grouping means, for assigning <u>an attribute</u> to <u>the first and second edges of the first and second virtual objects</u>, the attribute assigning means including:	an attribute assigning means coupled to said grouping means, wherein said assigning means is configured to assign an attribute to the first and second virtual objects, wherein the attribute assigning means comprises
hierarchy means for <u>assigning</u> a <u>grouping</u> hierarchy for the<u> first and second virtual objects wherein the second virtual object is assigned as a child object of the first virtual object and an orientation and a position of the child object is calculated relative to the first virtual object;</u> and	a hierarchy means for assigning a grouping hierarchy to the first and second virtual objects, wherein the second virtual object is assigned as a child object of the first virtual object, and wherein an orientation and a position of the child object is calculated relative to the first virtual object, wherein said attribute assigning means further comprises:
<u>origin assigning means for assigning an origin on the first virtual object around which the third virtual object can rotate;</u> and	an origin assigning means for assigning an origin on the first virtual object around which a third virtual object can rotate, wherein said third virtual object is selected by said selecting means from said plurality of virtual objects; and
constraint assigning means for assigning <u>a three-dimensional constraint</u> of motion to the	a constraint assigning means for assigning a three-dimensional constraint of

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the third virtual object to constrain how the third virtual object can rotate with respect to the first virtual object; and	motion to the third virtual object to constrain how the third virtual object can rotate with respect to the first virtual object.
rendering means for rendering the virtual world including the grouped object.	

Regarding claims 102-108, Applicants respectfully request that the Examiner compare claim 102 of this reissue application with claim 1 of the original patent (see table below). Applicants contend that claim 102 is directed to a different invention than claim 1 since claim 102 is directed to program that forms a "hierarchical grouped" object that is represented by a "hierarchical wireframe object" and a "hierarchical polygon" object. Applicants contend that the scope of claims 102-108 are materially different from claim 1, and thus Applicants contend that claims 102-108 do not violate the recapture rule. As noted in *Chisum on Patents*, a patentee may obtain on reissue a claim that varies materially from the claim originally surrendered **even though it omits a limitation intentionally added to obtain issuance of the patent.**[3]

Claim from original patent (with additions underlined)	Claim in present reissue application (emphasis added)
1. An apparatus for creating a virtual world data base, comprising:	102. (Amended) A computer program embodied on a computer-readable medium, wherein the computer program is configured to create a data base representing a virtual world by:
receiving means for receiving first, second and third polygon representations of respective first, second and third virtual objects in a virtual world;	receiving a plurality of polygon representations of virtual objects;

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[3] *See Donald S. Chisum, Chisum on Patents §15.03[2][e] (emphasis added).*

selecting means, coupled to said receiving means, for selecting a first edge of said first virtual object and for selecting a second edge of said second virtual object; and	selecting first and second virtual objects from said plurality of polygon representations of virtual objects;[4]
grouping means, coupled to the receiving means and the selecting means, for grouping said first and second virtual objects in the virtual world into a grouped object comprising said first and second virtual objects joined at an intersection of the first and second edges,	grouping the first and second virtual objects into a **hierarchical** grouped object, wherein said grouping includes: selecting a first mathematical edge of said first virtual object; selecting a second mathematical edge of said second virtual object; and
the grouped object represented by at least one of a three-dimensional and rotatable wireframe object and a three-dimensional and rotatable sweep polygon.	representing the grouped object by at least one of the following: a three-dimensional and rotatable **hierarchical** wireframe object, and a three-dimensional and rotatable **hierarchical** polygon object.

Applicants further highlight that dependent claims 103-108 recited additional features not addressed in claim 1, and thus differ in scope sufficiently to avoid the recapture rule. For example claim 106 recites "assigning a grouping hierarchy...calculating an orientation and position of the child object relative to the first virtual object...assigning an origin on the first virtual object around which the second virtual object can rotate; and assigning a three-dimensional constraint of motion to the second virtual object..."

Regarding claims 10-45 and claims 57-68, Applicants contend that independent claims 10 and 57 contains all of the features germane to the prior art rejection in the original patent under reasoning similar to that highlighted above for claims 46-56 and 69-108.

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[4] Applicants note that features corresponding to the original "selecting a first edge" and "selecting a second edge" features are recited below (see "grouping").

For at least the reasons set forth above, Applicants contend that claims 1-108 are allowable. Applicants request a telephone conference with the Examiner at the Examiner's convenience to discuss the Examiner's opinion as to what, if any, additional features should be added to the claims outlined above.

CONCLUSION

Applicants submit the application is in condition for allowance, and an early notice to that effect is respectfully requested.

If any extensions of time (under 37 C.F.R. § 1.136) are necessary to prevent the above referenced application(s) from becoming abandoned, Applicant(s) hereby petition for such extensions. If any fees are due, or if any overpayments have been made, the Commissioner is authorized to charge or credit said fees to Conley, Rose, & Tayon, P.C. Deposit Account No. 501505/5181-11402/DRC.

Also enclosed herewith are the following items:

☒ Return Receipt Postcard

☐ Petition for Extension of Time

☐ Fee Authorization Form authorizing a deposit account debit in the amount of $ for fees (   ).

☐ Other:

Respectfully submitted,

Dan R. Christen
Reg. No. 39,943
ATTORNEY FOR APPLICANTS

Conley, Rose & Tayon, P.C.
P.O. Box 398
Austin, TX 78767-0398
Phone: (512) 476-1400

Date: _Feb 21, 2001_

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46. (Amended) A memory media comprising program instructions for creating a data base representing a virtual world, wherein the program instructions are executable to implement:

receiving a plurality of polygon representations of _a plurality of_ virtual objects including a first virtual object, a second virtual object, and a third virtual object;

10 selecting the first and second virtual objects from said plurality of polygon representations of virtual objects using edges of the virtual objects;

grouping the first and second virtual objects into a three-dimensional grouped object represented by at least one of the following:

a three-dimensional and rotatable wireframe object, and

15 a three-dimensional and rotatable polygon object;

assigning a grouping hierarchy for the first and second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and

calculating an orientation and position of the child object relative to the first virtual object.

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69. (Amended) A method for creating a data base representing a virtual world, the method comprising:

receiving a plurality of polygon representations of virtual objects, wherein the plurality of polygon representations include a first, a second, and a third representation of respective first,

25 second, and third virtual objects, wherein the virtual objects have edges;

selecting first and second virtual objects using the edges from said plurality of polygon representations of virtual objects;

grouping the first and second virtual objects into a grouped object comprising a combination of the first and second virtual objects, wherein the first and second virtual objects

30 intersect; and

representing the grouped object by at least one of the following:

a three-dimensional and rotatable wireframe object, and

a three-dimensional and rotatable sweep polygon object.

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84.   (Amended)   A computer program for creating a virtual world data base, wherein said computer program is embodied on computer-readable media and comprises instructions configured to:

[store] read polygon representations of a plurality of virtual objects, including a first virtual

5   object, a second virtual object, and a third virtual object;

select [a] the first virtual object and [a] the second virtual object from said plurality of virtual objects;

assign attributes to the first and second virtual objects;

group said first and second virtual objects into a grouped object, wherein said first and second

10   virtual objects intersect;

represent the grouped object by at least one of the following:

        a three-dimensional and rotatable wireframe object, and

        a three-dimensional and rotatable polygon object;

assign a grouping hierarchy to the first and second virtual objects, wherein the second virtual

15   object is assigned as the child of the first virtual object; and

calculate an orientation and position of the child object relative to the first virtual object.

97.   (Amended)   [The] An apparatus [as recited in claim 95,] for creating a virtual world data base, comprising:

20   a receiving means for receiving first and second polygon representations of respective first and second virtual objects in a virtual world;

        a selecting means coupled to said receiving means and configured to select said first and second virtual objects by selecting one edge from each of said first and second virtual objects;

        a grouping means coupled to said receiving means and selecting means, wherein said

25   grouping means is configured to group said first and second virtual objects into a grouped object, wherein the grouped object is represented by at least one of a three-dimensional and rotatable wireframe object and a three dimensional and rotatable polygon object; and

        an attribute assigning means coupled to said grouping means, wherein said assigning means is configured to assign an attribute to the first and second virtual objects, wherein the

30   attribute assigning means comprises a hierarchy means for assigning a grouping hierarchy to the first and second virtual objects, wherein the second virtual object is assigned as a child object of

the first virtual object, and wherein an orientation and a position of the child object is calculated relative to the first virtual object, wherein said attribute assigning means further comprises:

an origin assigning means for assigning an origin on the first virtual object around which a third virtual object can rotate, wherein said third virtual object is selected by said selecting means from said plurality of virtual objects; and

a constraint assigning means for assigning a three-dimensional constraint of motion to the third virtual object to constrain how the third virtual object can rotate with respect to the first virtual object.

102. (Amended) A computer program embodied on a computer-readable medium, wherein the computer program is configured to create [method for creating] a data base representing a virtual world [, the method comprising] by:

receiving a plurality of polygon representations of virtual objects;

selecting first and second virtual objects from said plurality of polygon representations of virtual objects;

grouping the first and second virtual objects into a hierarchical grouped object, wherein said grouping includes:

selecting a first mathematical edge of said first virtual object;

selecting a second mathematical edge of said second virtual object; and

representing the grouped object by at least one of the following:

a three-dimensional and rotatable hierarchical wireframe object, and

a three-dimensional and rotatable hierarchical polygon object.

103.   (Amended)   The [method] medium of claim 102, wherein said first and second mathematical edges are single points.

104.   (Amended)   The [method] medium of claim 102, wherein said first and second mathematical edges are detached from said first and second virtual objects.

105.   (Amended) The [method] medium of claim 102, wherein the first and second virtual objects intersect, and wherein the grouped object comprises said first and second virtual objects

joined with at least a portion of said first edge of said first virtual object contacting at least a portion of said second edge of said second virtual object.

106. (Amended) The [method] <u>medium</u> of claim 102, further comprising:

5   assigning a grouping hierarchy for the first and second virtual objects, wherein the second virtual object is assigned as the child of the first virtual object; and

calculating an orientation and position of the child object relative to the first virtual object.

assigning an origin on the first virtual object around which the second virtual object can

10   rotate; and

assigning a three-dimensional constraint of motion to the second virtual object that constrains how the second virtual object can rotate with respect to the first virtual object.

107. (Amended) The [method] <u>medium of</u> [as recited in] claim 102, further comprising

15   specifying a minimum angle and a maximum angle that the second virtual object can rotate with respect to the origin.

108. (Amended) The [method] <u>medium of</u> [as recited in] claim 102, further comprising assigning an attributes to the grouped object, wherein the attribute is texture, color, normal

20   direction, maximum rotation angle, or minimum rotation angle.